

Advances in traditional herbal formulation based nano-vaccine for cancer immunotherapy

Yasmeen Saeed

Guangdong provincial key laboratory of utilization and conservation of food and Medicinal resources in northern region, Shaoguan university, china

Cancer is attributed to uncontrolled cell growth and is among the leading causes of death with no known effective treatment while complex tumor microenvironment (TME) and multidrug resistance (MDR) are major challenges for developing an effective therapeutic strategy. Advancement in cancer immunotherapy has been limited by the over-activation of the host immune response that ultimately affects healthy tissues or organs and leads to a feeble response of the patient's immune system against tumor cells. Besides, traditional herbal medicines (THM) have been well-known for their essential role in the treatment of cancer and are considered relatively safe due to their compatibility with the human body. Yet, poor solubility, low bio-availability, and lack of understanding about their pathophysiological mechanism halt their clinical application. Moreover, considering the complex TME and drug resistance, the most precarious and least discussed concerns for developing THM-based nano-vaccination, are identification of specific biomarkers for drug inhibitory protein and targeted delivery of bioactive ingredients of THM on the specific sites in tumor cells. The concept of THM-based nano- vaccination indicates immunomodulation of TME by THM-based bioactive adjuvants, exerting immunomodulatory effects, via targeted inhibition of key proteins involved in the metastasis of cancer. However, this concept is at its nascent stage and very few preclinical studies provided the evidence to support clinical translation. Therefore, we attempted to capsule previously reported studies highlighting the role of THM-based nano- medicine in reducing the risk of MDR and combating complex tumor environments to provide a reference for future study design by discussing the challenges and opportunities for developing an effective and safe therapeutic strategy against cancer.

Biography

Yasmeen Saeed is working as a faculty member, Guangdong Provincial Key Laboratory of Utilization and Conservation of Food and Medicinal Resources in Northern Region, Shaoguan University, Shaoguan.

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